Chapter II

REVIEW OF RELATED LITERATURE

The scholar has made an attempt to go through the literature related to various aspects of physical fitness and its influence on different age groups. A brief review of the studies conducted on physical fitness has been given in this chapter.

Barbanti\textsuperscript{1} established physical fitness norms for Brazilian school children. In the physical fitness test battery he included sit and reach test, modified sit-up test, nine minute run, twelve minute run, 50 metre dash, and standing long jump. The tests were administered to 2,342 school boys and girls.

Physical fitness norms for Nigerian boys and girls of 11 to 18 years of age were constructed by Anyanwu.\textsuperscript{2} The test items included were shuttle run, push-ups for

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\textsuperscript{1}Valdir Jose, Barbanti, "A Comparative Study of Selected Anthropometric and Physical Fitness Measurements of Brazilian and American School Children" Dissertation Abstracts International 43 (June 1983):3840-A.
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boys, chair push-ups for girls, flexed knee sit-ups, 45 metre dash, standing long jump, pull-ups for boys, flexed arm hang for girls, nine minute run for subjects 11-12 years and 12 minutes run for subjects 13-18 years. A comparison of the mean score of the United States and the Nigerian Youth showed that at the upper age levels, the United States youth had better physical fitness status than their Nigerian counterparts, whereas at the lower age level there was not much difference.

Singh³ prepared physical fitness norms for high school boys of Punjab State. Data were collected on five thousand subjects from various schools in the state. The test administered consisted of eight items i.e., standing broad jump, sit and reach test, agility run, sit-ups bent knee, 50 metres dash, push-up (chairs), cricket ball throw, 600 metres run-walk. The percentile norms for physical fitness tests were found to be valid and suitable to assess the physical fitness level of the high school boys ages 12 to 15 years.

Das prepared norms for evaluating performance in physical fitness for classes 9th, 10th and 11th in the Government Higher Secondary Schools of the Union Territory of Delhi.

Twenty percent of the schools in rural and urban area in the same population were taken up for this survey. In each school ten percent of students were tested on the items of AAHPER youth fitness test and N.P.F.P. Battery 'A' the items in the N.P.F.P. were the same as included in the syllabus of Central Board of Secondary Education. Norms were prepared for the boys of 9th, 10th and 11th classes and was statistically analysed which concluded that a comparison of obtained data with the data of American students show that the Indian students of classes 9th, 10th and 11th of these schools seems to be very poor in abdominal strength. The performance of students of class IX in all items of youth fitness tests was very poor and there was a remarkable spurt of performance in classes X and XI though still lower then that of students in United

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4 Tapan Kumar Das, "Norms in Physical Fitness Tests for Boys of Classes IX to XI of Government Schools of Delhi Administration" (Unpublished Master's Thesis Jiwaji University, Gwalior, 1980).
States of America except in pull-ups measuring shoulder girdle strength.

Zuti and Corbin\textsuperscript{5} conducted a research on physical fitness norms for college freshmen. They took 3000 freshmen of Kansas State University within the age from 17.6 to 19.5 years. The tests were conducted for strength tests, flexibility body composition, cardio-vascular fitness. The results appear to indicate that the college freshmen at Kansas State University were above average and the standards were appropriate for their use at national level.

Beckford\textsuperscript{6} conducted this study to evaluate the physical fitness level of Navajo girls 14 to 16 years old. AAHPER youth fitness test was administered on the subjects selected from seven schools of the region to measure the

\textsuperscript{5}William B. Zuti and Charlem B. Corbin, "Physical Fitness Norms for College Freshmen" \textit{Research Quarterly} \textbf{48} (May, 1977), 499.

\textsuperscript{6}Patricia A. Beckford, "A Normative Study of the Physical Fitness of 14, 15 and 16 years Old Navajo Girls Using AAHPER Youth Fitness Test" \textit{Completed Research in Health, Physical Education and Recreation} \textbf{14} (1978), p. 159.
physical fitness level. Also norms were established on the basis of scores obtained from test results from these schools. These norms were compared to national norms found in the manual accompanying the AAHPER youth fitness test. The results of this study gave an indication of the overall fitness level of 14-, 15-, and 16- years old Navajo girls of the seven test items, the Navajo norms were below the national norms on 5 items and above on the softball throw and 600- yard run-walk.

Veerawasmi7 conducted this study to evolve physical fitness norms for Higher Secondary Schools of Greater Gwalior.

212 male students were selected from four Higher Secondary Schools and AAHPER youth fitness test was administered on them. Again 793 male students from the remaining 23 schools out of 27 Higher Secondary Schools selected for this study acted as subjects and ICHPER physical fitness test was administered. The norms for

7B.M. Veeraswami, "A Normative Study of the Youth Physical Fitness Test for Boys in Grade Nine Through Eleven in Greater, Gwalior" Unpublished Master's Thesis (Jiwaji University, Gwalior, 1973).
item pull-ups, sit-ups, shuttle run, standing broad jump, 50 meter dash, softball throw, and 600 meters run-walk for the boys age group 13, 14, 15, 16, 17 were worked out. It was also concluded that in all items except pull ups of the AAHPER youth fitness test, the mean scores of Indian boys in all age groups were lower than the 50th percentile of American norms. There was a positive but low order of relationship between physical fitness and participation in physical activities. There was a positive correlated though low (r = .13) between physical fitness and academic achievement.

Resmussen⁸ conducted the study in South Dakota high school activities association. For this study one school was selected to represent each region or section, the number selected from each school was in proportion to the school enrollment. The AAHPER youth fitness test was administered to 1000 South Dakota boys in grade 7 through 10. Norms were established by computing every

fifth percentile. The scores of South Dakota boys were compared with those of national boys using age only. He found that the median scores of South Dakota boys at all ages were higher than those for national boys on all items except the pull-ups, the shuttle run, and the 50 year dash.

Busch\(^9\) conducted the study on South Dakota high school girls one school was selected to represent each region or section and number selected from each school was in proportion to the school's enrollment. 1000 South Dakota girls were selected as subjects from all the high schools from grade 7 through 10. AAHPER youth fitness test was administered. Norms were established by computing every fifth percentile. The scores of South Dakota girls were compared with those of national girls, using age only. The median scores of south Dakota girls were higher than those for national girls in all items except flexed-arm hand.

Bos\textsuperscript{10} prepared percentile norms tables for selected measures of strength, power, agility, flexibility, body composition and cardio-vascular and muscular endurance from data collected in five schools of the Unity of Christian School System at Hudsonville.

The Canadian\textsuperscript{11} Association of Health, Physical Education and Recreation youth fitness programme was started in 1984. The battery consists of six items, for boys and girls, age group seven to seventeen. The items were (i) one minute speed sit up, (ii) standing broad jump (iii) shuttle run (iv) the flexed arm hand (v) 50 yard run and (vi) 300 yard run.

Mistkawi\textsuperscript{12} prepared national norms for the one minute basketball throw for goal, pull ups, potato race, potato race.

\textsuperscript{10}Davis L. Bos. "Physical Ability Testing of Male Students in Grades Four Through Twelve" Completed Research in Health Physical Education and Recreation \textsuperscript{9} (1967):77.


\textsuperscript{12}John J. Mistkawi, "Norms for Eight, Nine and Ten Year Old Boys on Y.M.C.A. Athletic Achievement Test" Completed Research in Health, Physical Education and Recreation \textsuperscript{8} (1968):101.
standing hop-step and jump, push ups, standing broad
jump and softball target throw items of the Y.M.C.A.
National Athletic Achievement Programme Y.M.C.A.'s
throughout the United States tested 2000 boys in each
age group and the author obtained five percent of the
scores at the Salem Y.M.C.A. Oregon.

The AAHPER youth fitness test project represented
the first attempt by the physical education profession
establish national norms. The test battery was originally
developed in 1957 by a special committee of the AAHPER
recreation council. The youth fitness test now consists
of six items, for both and girls of age group 10 to 17
and college men and women. The norms were revised to
up-to-date it and make more scientific after comparing
the achievement of the youth of Great Britain, Japan etc.
with the American norms.\textsuperscript{13}

Bitcon\textsuperscript{14} constructed norm table for grade 9-12
by taking pull-ups two minute sit-ups, standing broad

\textsuperscript{13}American Association of Health, Physical Education
and Recreation, Youth Fitness Test Manual (Washington,

\textsuperscript{14}Lawrence E. Bitcon, "Validation of Four Item
Fitness Test and Norms for High School Boys in the State of
Iowa" Completed Research in Health, Physical Education and
jump and a 300 yards shuttle run and showed its validity against AAHPER youth fitness test validity and reliability co-efficients were .934 and .961 respectively.

Carl\(^{15}\) compared the norms of the boys and girls of Delaware with the national norms. The Delaware norms were equal to or higher than national norms between the 25th and 85th centile; tended to be higher on the 50th and 100th centile except for shuttle run.

Elizabeth\(^{16}\) prepared the percentile norms for girls age 12, 13, 14 and 15 on the North Carolina AAHPER Tests. The norms were prepared for each of the five test items; sit ups, side stepping, standing broad jump, modified pull ups and squat thrusts. The sit up item provided effective differentiation on the percentile scale for each age group. The concentration of scores in the middle of the distribution for the side stepping

\(^{15}\) Bolcock F. Carl, "Physical Fitness of Delaware Boys and Girls Grade Five Through Twelve" Completed Research in Health, Physical Education and Recreation 6 (1964): 60.

\(^{16}\) Francis Elizabeth, "North Carolina Association for Health Physical Education and Recreation, Physical Fitness" Percentile norms for Girls Age 12, 13, 14, 15" Research Quarterly (1960): 85.
test and the squat thrust test resulted in effective discrimination in the centre of the ranges for all age groups. The standing broad jump test provided the greatest ranges and the best differentiation of scores on the percentile scale for the age groups. The modified pull up test failed to differentiate the lower end of the distribution for all age groups but did discriminate above the 20th percentile.

Barnam\textsuperscript{17} studied the AAHPER Youth Fitness Test battery and administered the test to 78 girls in grade VIII at Mitchell Junior High School. The girls were classified by the Neilson-Cozens classification index and compared with national norms. The girls were above the average in sit-ups, standing broad jump, 600 yards run-walk, 50 yards dash and shuttle run but below in the softball throw and modified pull ups. The differences were attributed to their physical education programmes.

\textsuperscript{17}Elanche Kramer, Barnam, "A Study of Youth Fitness of English Grade Junior High School Girls of Mitchell, as Measured by AAHPER Youth Fitness Test" \textit{Research Quarterly} (1960):67.
Sittmann\textsuperscript{18} conducted this study to develop norms for North East Missouri State University students enrolled in the health and physical fitness concept classes. 372 male and 648 female subjects were tested for the sum of 6 skin folds, predicted % fat, predicted \( V_{O_2} \) max, grip strength, leg strength, back strength, vertical jump distance, and vertical jump power. Means, standard deviations, and range for all variables were calculated classification was based on sex. Percentiles in increments of 5 were constructed for each variable in each classification.

Sander\textsuperscript{19} conducted this study to determine the effects of learning aids on physical fitness and knowledge levels of fourth grade students and to determine the effect of game and a fitness trait on the physical fitness and knowledge level of 4th grade students.


Four experimental groups were involved in a six week fitness unit involving active games and a fitness trait. Two groups received additional fitness instructions and controlled groups received no fitness but participated in a Soccer Unit. Sander fitness knowledge test and the AAHPER youth fitness test (1976) were administered on the subjects. It was found that there was no significant main effect for experimental group on any physical fitness post test items, but active game and fitness trait treatment showed a significant main effect for experimental groups $A_2$ and $B_2$ in the 600 years run-walk.

Humphrey\textsuperscript{20} conducted a study to investigate the physical fitness level of third grade pupils taught by specialists and non-specialists. 100 specialist and 100 non-specialist people were selected randomly from 20 schools in Greeley, Colorado. The AAHPERD Youth fitness test was administered, the test consists of the following items - sit-ups, sit and reach skinfold measurement, one

\textsuperscript{20}Merry Ann, Humphrey, "A Comparison of Fitness Levels in Elementary Children as Taught by Specialist and as Taught by Non-Specialists" Dissertation Abstract International 44:6 (December 1983):1724-A.
mile run-walk, with the rest results, comparison was made between all subjects taught by specialist, and those taught by non-specialist and between females taught by specialist and non-specialist. The two group, t-test was used to made this comparison.

Analysis revealed that the specialist group had significantly higher scores on none of the twelve tested components. The specialist males scored significantly higher on the sit-ups, sit and reach, skinfold measurement and one-mile run-walk when compared with the non-specialist males. The specialist females scored significantly higher on the skinfold measurements than the non-specialist females.

Elnashar\(^{21}\) conducted this study on 399 males and 311 females aged 9-18 years enrolled in physical education classes in Fayoum, Egypt and were evaluated using the 6 item AAHPER youth fitness test. Comparison of 50% with American norms revealed that Egyptian

sample was substantially below average fitness in both sexes across all age groups. Only pull-ups in males and flexed arm hand in females in the early age group were above the American standard. Comparison between males and females revealed males significance superior across all ages even when age, height and weight were held constant by ANCOVA. An eight week physical fitness programme produced significant improvement in all tests in both sexes.

Walkar\textsuperscript{22} conducted this study on white and black female students at northern high school. 50 black and 50 white female 10 grade students were randomly selected as the subjects. AAHPER youth fitness test was administered on item. Statistically analysed, it was concluded that the black subject scored significance higher (P \(>\) .05) than the white subjects on leg power, \((M = 44.6% \text{ and } 31.2\%\)) and \((M = 57.8\% \text{ and } 39.1\% \text{ respectively})\). The white subjects performed significance higher than black subjects on abdominal strength \((M = 31.5\% \text{ and } 24.7\%)\). No other comparisons were significant.

\textsuperscript{22}Mary F. Walkar, "Physical Fitness of 10th Grade White and Black Female Students of Northern High School" Completed Research in Health, Physical Education and Recreation 24:19 (1982):53.
Taddonio\textsuperscript{23} conducted this study to compare the physical fitness of public school students from economically deprived areas with national norms. It also compared the physical fitness of public school students from high poverty area with those from low poverty area. The national norms were developed from the 1975 national survey of youth fitness. The AAMPER youth fitness test was used as the measures of physical fitness. The subjects 90 Title 1 eligible schools, 180 classrooms, and 1080 students from 12 largest standard areas in the United State were taken for this study.

When statistical analysis involved, it was found that there was no difference in the physical fitness of boys and girls from the economically deprived sample and boys and girls represented by 1975 national norms. Also there was no difference in physical fitness of boys or girls, for high poverty areas and girls from low poverty areas.

Tucker$^{24}$ conducted this study on 76 female subjects in grade 7, 8 and 9 at Schulyer county junior school in Queen city. Subjects were pretested and post tested for physical fitness and self-concept after a 6 m.o.p.e. programme. The AAHPER youth fitness test was used to test fitness variables of 600 yard run-walk, sit-ups, 50 yard dash, 40 yard shuttle run, standing broad jump, and flexed arm hang. An average fitness percentile concept scale was used to measure self-concept variable. Paired t-test revealed that subjects improved (P .01) in total self-concept and average fitness (P .01). Average fitness and total self-concept were related on the pretest ($r = .30$, P .01) and the post-test ($r = .37$, P .01). The best predictors of self-concept were average fitness, 50 yard dash, flexed arm hang, 40 yard shuttle run, and sit-up accounted for only 15.56% of the variance in total self-concept.

Saha\textsuperscript{25} compared the selected anthropometric measurement and physical fitness variables of the tribal and non-tribal students of Tripura.

The subjects were 60 male students of tribal origin and 60 male students from non-tribal group and their age ranged from 14 to 18 years. Anthropometric measurements were taken systematically in all subjects. Three selected items i.e., 50 metre dash, 50 metre shuttle run and 600 metre run-walk of AAHPER youth fitness test were administered and was statistically analysed by using t-scale. It was concluded that in anthropometric measurements and physical fitness components, the mean scores of the composite scores of tribal school students was higher than that of the non-tribal school students (2) there was no significant difference in anthropometric measurement and in physical fitness level (3) the tribal students were superior in upper arm girth, calf girth and body weight and non-tribal students were superior in shuttle run, but there was no difference in shuttle run, but there was no difference in chest girth.

\textsuperscript{25}Umesh Chandra Saha, "\textit{Comparison of Selected Anthropometric Measurements and Physical Fitness Variables of Tribal and Non-Tribal Students of Tripura}" Unpublished Master's Thesis (Jiwaji University, Gwalior, 1980).
thigh girth, height, 50 metre dash and 600 metre run-walk of both the tribals.

Ray\(^{26}\) compared the physical fitness of urban and tribal college students of Agartala. The subjects were 60 men students from tribal group and 60 men students from urban group and their age ranged from 16 to 20 years. Data was obtained by administering the AAHPER youth fitness test and was statistically analysed by using percentile scale. It was concluded that the performance of urban students in pull-ups and softball throw for distance was significantly greater than the tribal subjects, and also there was no significant difference between the urban and tribal students in standing broad jump, shuttle run, 600 metre run-walk, 50 metre dash and sit ups. Also, there was no significant difference in physical fitness level between urban and tribal college students of Agartala.

Colgan\textsuperscript{27} conducted this study to compare the AAHPER youth fitness test and a proposed fitness test to determine the tests measured the same fitness components, girls and boys (N = 326) from St. John's English School in Walterloo, Belgium (grade 5-12) were evaluated on both tests.

The fitness items used were the 6 items of the AAHPER youth fitness and 3 items recommended by ARAPCS committee. Both the tests when statistically treated revealed that the AAHPER youth fitness and proposed test were measuring different components of fitness. It was concluded that AAHPER youth fitness measures "motor performance," while the proposed fitness test measures fitness and endurance. AAHPER youth fitness measures the same component for males and females, but age interacts with performance to a greater extent in females.

Tuteja\textsuperscript{28} conducted a study to find out the comparison of physical fitness of rural and urban school.

\textsuperscript{27}Sharon M. Colgan, "A Comparative Study of the AAHPER Youth Fitness and a Proposed Fitness Test," Completed Research in Health, Physical Education and Recreation 21 (1978):244.

students of Delhi. The subjects were 100 men students from rural and 100 men students from the urban area, high school of Delhi. The age of the subjects ranged from 14 to 17 years. AAHPER youth fitness test and N.P.E.D. tests were administered to obtain the physical fitness levels of the subjects. The raw scores from AAHPER youth fitness tests and N.P.E.D. test were statistically treated and 't' scale was computed for the test items of both the tests. It was found that in AAHPER youth fitness test the mean of the urban high school students was higher than the mean of rural area students, whereas mean of the rural high school students was slightly higher than that of the urban high school students in N.P.E.D. test. It was also found that there was no significant difference in the physical fitness level of rural and urban high school students of Delhi.

Paradis\(^{29}\) conducted a study to compare the physical fitness scores of white and black students. The subjects taken for the study were 30 white and 30 black students.

of equal socio-economic level. Data was also collected for age, height and weight and socio-economic level. AAHPER youth fitness test was selected as the instrument by which physical fitness performance was evaluated, and statistically analysed and t-test was used. It was found that there was no significant difference between the groups of age, height, weight and socio-economic level. The black students exceeded the white students significantly on the shuttle run, 50 yard dash, 600 yard run-walk and composite fitness score. It was concluded that black male students of similar socio-economic level to white students in the seventh grade, have a higher level of physical fitness.

Hasche made a comparative study of physical fitness between athletes (N = 20) and students in the required physical education programme (N = 26). Inter and inter-group comparisons were made from the data collected from eight items physical fitness tests. The results revealed that the athletic group significantly

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improved in six of the eight test items, the physical education group improved in only two of the items. It was concluded that participation in inter-scholastic athletic programme may improve physical fitness.

Herman\textsuperscript{31} administered the AAHPER youth fitness test to 100 rural and 10 urban boys. The urban boys were superior to the rural boys and the difference was significant at .01 level. The two samples were weaker on the same components of physical fitness.

Meeks\textsuperscript{32} administered the AAHPER youth fitness test to 264 girls at Human junior high school St. An Missouri. The 27 girls who scored highest on the test were designated as the 'fit group' and the 27 girls who scored lowest were designated as the unfit group. These groups were compared in academic achievement by grade point average, personality by the california test of personality and social acceptance among their peer group by a sociometric design. The physically fit

\textsuperscript{31}Boone Herman, "A Comparison of the Physical Fitness Level of Urban and Rural Boys," \textit{Completed Research in Health, Physical Education and Recreation} 10 (1967):86.

students had better personality made better grades and were more socially accepted by their peers than the physically unfit students.

Alston\(^{33}\) made a comparison between the performance of girls on the Virginia physical fitness test, AAHPER, youth physical fitness test and North Carolina physical fitness test. He found the correlation between the Virginia and AAHPER test was .89, between the AAHPER test and the North Carolina test .50. The mean differences gave essentially equivalent results for assessing physical fitness of high school.

Ikeda\(^{34}\) studied the physical fitness norms in order to compare the physical fitness of children in Iowa and Tokyo, Japan. The Iowa test of motor fitness was given to 395 Tokyo children and 355 Iowa children,

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\(^{34}\) Ikeda, Namika, "A Comparison of Physical Fitness of Children in Iowa, USA and Japan," *Research Quarterly* 33:4 (December 1962): 541-552.
9 to 12 years of age. The test battery included sit-ups standing broad jump, shuttle run, forward bend, grass hopper, pull ups for boys, bend arm hang for girls and 50 yard dash. Anthropometric measurements were taken in height, weight, knee-finger length and leg length. The results indicated that Iowa children were heavier, taller and had longer legs than Tokyo children, but Tokyo children scored better in all the motor performance tests except sit ups.

Knuttgen\textsuperscript{35} conducted this study to compare the physical fitness of Danish School children with that of American standards. 319 male and 134 female Danish School children were randomly selected as the subjects and AAHPER youth fitness test was administered to these subjects, which correspond to the 7th through 12th grades in the United States. Then results of the testing were compared to the American standards, which were compiled in terms of both age and to Neilson Corzens classification index. It was concluded that

Danish boys, more than 50 percent scores did exceed the American averages in six of the seven events. The only event in which they fell short of American averages with the softball throw. In pull-up 59%; sit-up 62%; shuttle run 90% of Danish boys were as high or higher than the American Averages. Similarly Danish girls exceeded the American Averages in all the seven of the tests. In 50 yard dash 71%; softball throw 76%; the sit-up 82%; standing broad jump 89% and pull-up 90% Danish girls equalled or exceeded the American Averages. The best results for Danish girls was in shuttle run and 600 year non-walk. Two percent of the boys scores and 86% of the scores of the girls exceeded the various American mean scores.

Waterstreet\textsuperscript{36} studied the physical fitness and determined the rate of improvement in the test and compared those who had elementary school physical education training with those who had no specialized instructions. A test battery consisting of push-ups,

sit-ups, standing run, was administered three times annually from 1959-60, and achievement scales were developed and subjects showed improvement from the beginning to the end of each school year. The group with elementary physical education background was superior to all the initial tests in the freshman year. However, the group with no elementary physical education equalled or surpassed the other group in all tests during the Sophomore years.

Beltroa\(^{37}\) conducted a study on the AAHPER national youth fitness test on 232 Brazilian girl students. The results were compared with the standards for girls in the United States. The comparison of median scores within each age group showed that Brazilian girls had consistently better results in the standing broad jump and 600 yard run-walk than the girls represented by the standard. The United State girls had a higher median scores in the softball throw in every age group. No consistent differences were found in the other test events.

Shankar\textsuperscript{38} conducted this study on 360 healthy Punjabi male of 18 to 21 yearly age groups. The data were collected from the educational institutions during 1983-84, to determine the general cardio-vascular fitness. The Kasch pulse recovery test as described by Barrow and Mc Gee (1978) was used for each subject. The general cardio-vascular fitness increases with age upto 19 years and the maximum fitness was observed during 19 years the cardio-vascular fitness seems to be stable. This is because that maximum growth of different body organs is attained around 19 years and thus during this/period the one seems to be more physically fit as compared to his early years of age.

Brogdon\textsuperscript{39} undertook a study on comparing certain physical fitness and anthropometric measures for early adolescent Mexican American and Anglo American males. The findings revealed significant difference between the Mexican American and Anglo-American males in certain physical fitness items and anthropometric measures. The


Anglo-American males were superior in performance of sit-ups and the standing broad jump. The findings also revealed significantly large anthropometric measures for Anglo-American male in all, but four measurements: i.e., width; shoulder width, waist girth and chest girth were large in Mexican American males. The relationship between selected anthropometric measures and various physical fitness test items were significantly higher for the Mexican-American male.

Johnson\textsuperscript{40} in this study proved that AAHPER youth fitness test is partial indicator of both motor and cardio-respiratory fitness. He administered these two tests to 47 women physical education major. Significant relationships were found between the t score total of the AAHPER test and both the distance covered and fitness categories of Cooper's 12 minute test. Other significant relationships were found between each items of AAHPER battery and t score totals of the battery. Five of these items i.e., 600 yard run-walk, softball throw, standing

\textsuperscript{40}Karle Ruth, Johnson, "The Relationship Between the AAHPER Youth Fitness Test and the 12 Minute Test," Completed Research in Health, Physical Education and Recreation 12 (1970):150.
broad jump, shuttle run and bent arm hang were found to be significantly related to 12 minutes run-walk test.

Cray, Henry and David\textsuperscript{41} studied the reliability of multi-trial items of AAHPER youth fitness test. Their study revealed that for standing broad jump and softball throw two trials would be sufficient instead of three trials, for shuttle run three trials are necessary instead of two trials; and for 50 yard dash two trials are necessary as prescribed in the AAHPER youth fitness test manual.

Boespflug\textsuperscript{42} took up the study of the relationship between physical fitness, social acceptability social adjustment, intelligence and academic achievement. In this study the physical fitness of 50 track experienced subjects was measured by AAHPER youth fitness test social acceptability was assessed by the Harman Nelson test of mental ability and academic achievement was represented by grade point average. Those subjects who obtained high physical fitness score appeared more

\textsuperscript{41}Marmis Cray, Montoya J. Henry, and A David, "Reliability of the Multi-Trial Items of AAHPER Youth Fitness Test," Research Quarterly \textbf{40}:1 (March 1969):240-245.

socially adjusted and also had better academic achievement than those subjects with low physical fitness score.

Klesius\textsuperscript{43} conducted this study to consider the effect of correlating various combinations of measures collected in the administration of the AAHPER youth fitness test with contest of a test retest reliability to determine the reliability of the selected test items and relative efficiency of the performance measures.

The test items were administered to 150 tenth grade male students at Peon Senior High School, Florida. The test were administered in the following order standing broad jump and 50 year dash, three trials each, shuttle run and softball throw for distance, three trial each, pull ups, sit ups, and 600 yard run-walk, on trial each. On statistical analysis it was found that with the exception of the sit up all the items are reliable, exception in the case of sit-up and shuttle

run the first trial itself gave satisfactory indices of performance.

The relationship of socio-economic status and physical fitness was studied by Jasper. Sixteen girls of grade six each from families having annual incomes below 5000 dollars, from 5000 to 9999 dollars and above 10,000 dollars served as subjects. The girls were tested in flexed arm-hang, sit-ups, squat thrust, standing broad jump and 200 yard run. Analysis of variance showed no significance among the three socio-economic groups.

Barkar investigated the relationship between socio-economic status and AAHPER physical fitness scores. Subjects were 329 girls and 304 boys of age 10, 11 and 12. Significant relationships were found but they did not

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favour any one status group in all the components of
fitness. There were indications that lower status girls
were faster, were better coordinated and had more
endurance but that upper status girls were stronger in arm
and shoulder girdle strength, in abdominal and hip flexor
muscles and muscular explosiveness. Results indicated
that lower status boys were faster and better in combined
agility and speed and strength of abdominal and hip
flexor muscles.

Stein\textsuperscript{46} conducted the study to ascertain the reliabil-
ities of individual test items of the youth fitness
test. 10th and 11th grade students of wake field high
school were selected as the subjects. AAHPER youth fitness
test was administered and the reliability co-efficient
for all the item was determined. He found that five of
the seven test items (pull-ups, broad jump, sit-ups,
50 yard dash and softball throw) high very high reliability
co-efficients ranging between .90 and .98. The other

\textsuperscript{46} Julian U. Stein, "The Reliability of Youth
Fitness Test Items," Research Quarterly 35:3 (October
two items (shuttle run and 600 yard run-walk) show average to high relationship ranging between .74 and .83. All the reliability co-efficients were significant beyond .001 level.

True the AAHPER youth fitness test was administered to a sample of 56 boys, including 20 athletes and 36 non-athletes, the regular programme of physical education was administered to all classes until the first week of April, 1961. The test was again administered, after which the classes were exposed to an accelerated programme of conditioning. Significant increase were shown for both groups as a result of the accelerated conditioning programme in the pull-ups, push-ups, and 600 yard run-walk. The non-athletic group showed significant improvement from the accelerated programme in all the tests except in standing broad jump.

Kim conducted this study to investigate the relationship between the Korean youth fitness test

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(KYFT) and the AAHPERD physical fitness test (AHRPT). Three hundred male Korean students grade 7th to 11th were subjects. The subjects completed 11 experimental test items and the data were analysed by three different statistical methods: simple, multiple and canonical correlation.

It was concluded that the KYFT and AHRPFT were considerably related. KYFT which is a motor related physical fitness test provides information similar to the AHRPFT, a health related physical fitness test. AHRPFT can be substituted for KYFT, since this test has fewer and easier items to administer except for the 2.5 km run. This substitute is even better if the modified pull up is added to the AHRPFT.

It was found that correlation between KYFT and AHRPFT were higher for the middle school students than for the high school students. There was a significant relationship between the KYFT and AHRPFT for the middle and high school students.

Earls\textsuperscript{49} conducted this study to determine the effect of a newly organised physical education programme.

on the physical fitness, motor skills and knowledge of physical education of 1000 boys and girls in grades one through six from September 1970 to May 1973. All students were given the treatment programme daily. A random sample of 50 per cent of students in grade four through six received the AAHPER youth fitness test twice a year. Selected items from Minnesota motor performance test was administered twice yearly to 50% students in grade two to six in 1971-72 and 1972-73. A random sample of 30 percent of the student in grade four through six were administered in AAHPER youth fitness test in April every year. Physical fitness and motor skills level were improved significantly. Knowledge was improved significantly for 4th grade.

Watson\textsuperscript{50} conducted this study to evolve norms for Nebraska boys and girls. The test items for the Neb ELE physical fitness test are standing long jump, or vertical jump, 50 yard dash, sit ups, stick jump, and 300 yards distance run. The items for secondary test are pull-ups, or flexed arm hang, 50 yards dash,

\textsuperscript{50} Rick E. Watson, "The Establishment of Norms for Nebraska Physical Fitness Test," \textit{Completed Research in Health, Physical Education and Recreation} 19 (1978):103.
standing long jump, sit up, side step, and mile or 9 minute run or 12 minute. A random sample of schools in Neb (1%) was selected to participate in the establishment of these norms. The norms were established for each test items for girls, boys and the groups according to the chronological age. Percentile tables were constructed based on the results of the investigation, the following recommendations were formulated. There should be a test item included in ELE test, grade 1-6, to evaluate shoulder girdle strength. Norms need to be established for the 1½ mile or 12 minute run. The secondary girls need to establish norms for the girls chin ups.